

## Converging Innovations in the Modern Humanitarian Science

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**Abstract:** The study considers the issue of converging innovations as the ‘growth point’ of the modern science. The description of the existing trends in performance of the converging studies is provided. It is noted that understanding of convergence is often interpreted narrowly and is reduced to the issue of the intra-disciplinary convergences. It is substantiated that in terms of methodology the concept of convergence suggests transition to another level of research works based on the application of the interdisciplinary system-integrated methods, approaches and techniques. It is this attitude that results in the change of the scientific paradigm of the modern scientific knowledge. The necessity of the comprehensive theoretical-methodological approach to the study of interdisciplinary convergence is pointed out. The three-layered model of methodology of the converging studies is proposed that is being currently formed in the sphere of humanitarian sciences. The concept of the general ground for implementation of the interdisciplinary approaches at the first and second levels of the methodological model is substantiated. The concept of the reasonable ground for supplementation of the general scientific methods and specific techniques on the third methodological level is introduced. The possible results of the practical application of the proposed concept of methodology of the converging innovations are based on: the concept of the system-integrated approach to the process of converging developments as such in unity of the three methodological levels from the universal-theoretical to the specific-technological (methodological) one; on the understanding of the ‘reverse process’ when integration of the results of the third, specific level of methodology becomes the basis for substantiation of the new theoretical concepts of the fundamental level of interdisciplinary convergence.

**Key words:** Convergence, interdisciplinary methodology, new scientific paradigm, noosphere, general scientific world-image, dialogism, information-communication environment, converging journalism

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### INTRODUCTION

Today, the concept of convergence is defined as the growth point of the modern sciences focused on searching for the breakthrough projects providing the possibility of creation of the whole new trends and results in the scientific development. Convergence may be implemented on the basis of the interdisciplinary approach. This approach allows seeing how the research areas and technologies appear during the process of integration of methodological framework of different sciences (Lyall *et al.*, 2011). The communities of experts from different areas of expertise are being actively created, for example, World Technology Evaluation Center that by joint efforts try to identify the basic principles of convergence of the human activity and to understand how it works (Bar-Yam, 2003).

### MATERIALS AND METHODS

The term ‘convergence’ was introduced by Roco and Bainbridge (2003). Their forecasts concerning creation of the converging NBIC technologies (Nanotechnology,

Biotechnology, Information Technology and Cognitive Science) were taken as the basis for the well-known report “Converging Technologies for Improving Human Performance”. The role of the NBIC convergence as the mechanism of interpenetration of different scientific areas chemistry, biology, economics, political studies, psychology, etc. was emphasized (Roco and Bainbridge, 2003). In the Russian Science, the convergence alternative was proposed in 1998 by Kovalchuk (2011) that founded the center of converging technologies on the basis of the Kurchatov institute headed by him.

In different areas of the modern science, there are quite a lot of studies concerning the issues of the converging models of innovative development. The philosophical-anthropological aspect of converging technologies is focused on the study of the processes of changing of the human identity as such in the future (Bensaude-Vincent, 2008). In the sphere of economics, the options of approximation of different economic system upon the presence of the single objective laws of development are investigated (Sax and Warner, 1995). Sociology studies the process of approximation of the opposite social systems (Malysheva, 2000), etc.

Along with that, understanding of convergence is often interpreted narrowly and is reduced to the issue of the intra-disciplinary convergences. In terms of methodology, the concept of convergence suggests transition to another level of research works based on the application of the interdisciplinary system-integrated methods, approaches and techniques. It is this attitude that results in the change of the scientific paradigm of the modern scientific knowledge. However, the main question still remains open, in which way the process of reconstruction of the scientific knowledge shall be performed, what its theoretical-methodological framework is? Without solving this issue the converging innovations pursuits in different academic fields may lose efficiency significantly and gain the compiled, shallow nature. In this regard, the humanitarian-world-view complex plays the essential role in substantiation of the converging methodology constituting the new paradigm of the modern science. Brief description of these provisions is the first task of the study.

It shall be taken into account that the long-term goals of the NBIC-projects may be achieved step by step: interdisciplinary content shall be worked out within the specific scientific trends on the basis of the dedicated research methods or converging technologies. Reference to these results is the second objective of the study.

## **RESULTS AND DISCUSSION**

In the development of science, the two basic paradigms have been formed, the narrowly-specialized one that determined the peculiar features of the classical education and interdisciplinary the establishment of which started recently. At the first stages of development, the concepts of integrated approach in philology met heavy resistance on the part of the learned society, since changes of stereotypes is a complex task in the science relating to the change of the thinking patterns of a researcher as such. However, when the concepts of comprehensiveness gained popularity, the harm from the compiled works became even more substantial. Comprehensiveness shall not be understood broadly as enrichment of the traditional science 'by means of introduction of new terms and concepts borrowed from the area of cybernetics, semiotics, axiology, etc. by referring to the studies of psychologists, sociologists and citing of philosophical literature' (Nigmatullina, 2004). This is, first of all, development of the proprietary methodological and methodical issues within the specific scientific area on the basis of achievements of the other sciences.

This is why, today for the fruitful implementation of innovations the well-considered

theoretical-methodological framework is required that is based on interdisciplinary scholarly apparatus and system approach. Today, the following three-level model is being formed in the area of humanitarian sciences:

- Universal philosophical-culturological methodology
- General scientific system-synergetic and interdisciplinary research methods integrated in the goals and tasks of separate humanitarian areas
- Specific system-integrated techniques of text interpretation and dedicated integrative technologies

The common ground for implementation of the interdisciplinary concept that became the fundamental one in the theory and methodology of convergent studies had formed in the science by the end of the last third of the 20th century. It proceeds from the concepts of the general systems theory, system approach synergetics (Corning, 2005, 1995). These concepts allowed substantiating the fundamentally new image of the world and ideas of the universal laws of its evolution (classical, non-classical and post-classical world-image). This general scientific worldview includes new understanding of the laws of systemic self-evolution of the objective world, relations between a human, nature and society, the new concept of determinism and mechanism of its system-synergetic action, complementarity of the material and ideal, etc.

As the example of the established system of determination of the objective reality, the cosmism subject was provided that was discontinued in the Russian science at the beginning of the 20th century. The implementation of it will help to understand many things in the general scientific worldview within which the complex interaction of human and nature may be understood (in a new way, it can be understood by a complex interaction of man and nature). It is referred not to the necessity of vivification of the inward human nature only (the works by Ch. Aitmatov, V. Rasputin etc., but also to understanding of the new principle that is substantiated in the modern natural scientific studies (the noosphere concept by V. Vernadsky). In other words, this is the possibility of materialization of the spiritual energy being generated by a human that as the result objectifies his superb potential (Bogatkina, 1994).

The cosmism of the 19th, the middle of the 20th century was the expectation of victory of the positive understanding of the noosphere human nature, however by the end of the 20th century a critical situation arises that requires special analysis. The current transient period has also revealed the possible tragic consequences of materialization of the negative energy of humankind appearing in the atmosphere of the general cultural relativistic complex that is defined as the non-classical worldview.

The concept of the convergent integration may be also implemented on the third level of the proposed methodological model, on the basis of the specific methods and techniques that are based on the general scientific system-integrated, synergetic and other methods. The sufficient ground concept shall be introduced for supplementation of the general scientific methods and specific techniques. In humanitarian sciences, this is the concept of the dialogical nature of artistic creativity understood not only within the context of M. Bakhtin's ideas but also in a broader ontological meaning as a cognitive-communicative function of human cognition. In this sense, the dialogical attitude of the modern humanitarian methodology reveals the prospects in the development of the 'convergent journalism' representing the complicated process of integration of the modern technologies. As the result, the fundamentally new information-communication multimedia environment is being formed.

The convergence concept was also born as an attempt to go beyond the scope of the traditional model of interaction 'science, technology, practice'. In the convergence project, the research methods and technologies shall reach the level of fundamental knowledge. In other words, the reverse process is initiated in justification of the convergence theory integration of the results of the third, specific level of methodology serves as foundation for creation of the fundamental level of the scientific knowledge. In this regard, the humanitarian-world-view complex plays the essential role in substantiation of the converging methodology constituting the new paradigm of the modern science.

**Summary:** Thus, the proposed variant of the convergent methodology is not the resulting, final but the system-procedural model representing, on the one hand, design of integrative methods and techniques at the interface of different sciences within different areas of the scientific knowledge, on the other hand, allows realizing their, inverse effect on formation of the universal principles of interdisciplinary methodology.

## CONCLUSION

- Performance of the convergent innovative studies is possible on the basis of the interdisciplinary system-integrated methodology representing the modern paradigm of development of the humanitarian scientific knowledge
- The cohesive (holistic) approach to performance of convergent studies is based on the three-level methodological model

- The mechanism of the comprehensive and supplementing operation of this convergent methodology is based on substantiation of the concepts of the common and sufficient grounds

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## REFERENCES

- Bar-Yam, Y., 2003. Unifying Principles in Complex Systems. Converging technologies for improving human performance: nanotechnology, biotechnology, information technology and cognitive science Edited by Mihail C. Roco, William Sims Bainbridge. Dordrecht, the Netherlands, pp: 380-409.
- Bensaude-Vincent, B., 2008. Technoscience and Convergence: A Transmutation of Values? Summerschool on Ethics of Converging Technologies. Dormotel Vogelsberg, Omrod/Alsfeld, Germany.
- Bogatkina, M.G., 1994. The concept of the sublime in the Russian poetry of the beginning of the 20th century M.G. Bogatkina, Wiener Slawistisher Almanach. Munchen, No. 34.
- Coming, P.A., 2005. Holistic Darwinism: Synergy, Cybernetics and the Bio economics of Evolution: Chicago, University of Chicago Press.
- Coming P.A., 1995. Synergy and self-organization in the evolution of complex systems. Systems Res.
- Kovalchuk, M.V., 2011. Sci. and Life: My convergence. Popular scientific and conceptual papers. M.V. Kovalchuk M.: Academkniga.
- Lyall C., A. Bruce, W. Marsden and L. Meagher, 2011. Identifying key success factors in the quest for interdisciplinary knowledge. University of Edinburg, pp: 56.
- Malysheva, D., 2000. Postindustrial world and globalization processes. World economy and international relation, No. 3.
- Nigmatullina, Y.G., 2004. System-integrated analysis of artificial creativity: the history of the discipline at the Kazan University. Y.G. Nigmatullina. Kazan: Publishing House of the Kazan University.
- Roco, M. and W.S. Bainbridge, 2003. Converging Technologies for Improving Human Performance. NSF-DOC Report Boston: Cluwer.
- Sax, J. and E. Warner, 1995. Economic convergence and economic policy. Economic matters, No. 5.